Does steel transmit more sound than wood, masonry when used as a framing material? A recent study conducted by the National Association of Homebuilders Research Foundation to determine the current state of the art indicates that the acoustical performance of steel framing components in residential and light construction is equal to that of wood, concrete or masonry.

The study was accomplished through evaluation of key regulatory agency requirements, discussions with industry experts and an analysis of published data that was available to the Foundation.

Based on these findings, the Report sets forth fundamentals of residential acoustics, comments on the acoustical performance of wall and floor assemblies containing steel framing components, and makes recommendations for good acoustical practices.

The study, which was conducted at the request of American Iron and Steel Institute, reveals that several factors govern the acoustical performance of any building material and that all these factors are a consideration, not just the material.

Workmanship, for example, would influence the overall sound conditioning to a greater degree than any reasonable use of steel components for walls and floor framing. Another conclusion drawn by the Foundation through the study is that, in many cases, the sound transmission performance of steel load-bearing walls is even better than wood. Further study and extrapolation of test data show that load-bearing steel stud walls can be made to perform as well acoustically as a typical masonry wall. Finally, a fourth conclusion drawn is that steel floor joist systems will also perform as well as wood joist floor systems for a typical range of acoustically treated floor/ceiling assemblies.

The NAHB Research Foundation has not found that any one building material is any better than another in reference to transmission of sound. Rather, it suggests that the best deterrent against sound transmission is good construction practices. Regardless of the type of construction, careful planning, sound construction methods and good supervision are the most important requirements for achieving good acoustical construction details that will allow the full acoustical performance potential of the walls and floors to be realized.

Several other significant factors that influence sound transmission were also pointed out in the study. Almost without exception the impact sound transmission (noise from slamming doors, footsteps) through floors is the principal cause of acoustical complaint even when extensive impact sound conditioning measures have been used.

In studies conducted by the Foundation, nearly one-half of the occupants interviewed heard impact sounds through floors and a significant proportion were disturbed by such sounds.

Another very important factor in sound transmission is a hole or opening in a wall or floor. For instance, a one-inch square hole in a one hundred square foot STC (Sound Transmission Class) 50 wall reduced the acoustical value of that wall to an STC 39!

Many causes significantly influence acoustical performance and sound transmission other than the details of wall or floor construction. All of these conditions must be considered when developing the sound conditioning design.